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Superfund Record of Decision (EPA Region 7) Fulbright/SAC River Landfill, Missouri (First Remedial Action), September 1988

(U.S.) Environmental Protection Agency, Washington, DC

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EPA

Superfund Record of Decision:

Fulbright/SAC River Landfill, MO

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16. Abstract (Limit: 200 words)

The Fulbright and Sac River Landfills are located just north of the City of Springfield, Missouri, in a semirural area. The site is in the flood plain of the Little Sac River, and is owned by the City of Springfield, along with much of the surrounding land. Adjacent land use includes a police shooting range, an animal shelter (dog pound), and an inactive wastewater treatment plant. The landfills were operated by the city for the disposal of municipal and industrial solid wastes. The Fulbright Landfill covered 98 acres and operated from 1962 through 1968. The Sac River Landfill, formerly known as the Murray Landfill, covered 114 acres and was in operation from 1968 through 1974. Generally, wastes (drummed or bulk) were disposed of in trenches and covered with soil. The City of Springfield and Litton Industries Inc. agreed to conduct the RI and the FS under the oversight of EPA. Several leachate seeps have been noted, especially during wet weather. In addition to the landfill areas, another source of contamination was identified where a few dozen drums and waste residues were disposed of in a sinkhole on the bluff above the Fulbright Landfill. Based on data from the RI, environmental contaminant concentrations in soil, ground water, leachate, surface water, and sediments do not exceed applicable or relevant and appropriate requirement standards. The site, however, could endanger human health or the environment in the

(See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision
Fulbright/SAC River Landfills, MO
First Remedial Action - Final
Contaminated Media: debris
Key Contaminants: acid, cyanide

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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16. ABSTRACT (continued)

future through exposure of the industrial wastes through erosion of the landfill cover, installation of drinking water wells at or near the landfills, or from direct contact with leachate at the seeps. While a reference is made to disposal of cyanide and acid wastes, the primary contaminants of concern affecting the media investigated are not listed in the ROD.

The selected remedial action for this site includes: removal of the drum and drum remnants found in the sinkhole and associated trench east of the Fulbright Landfill; sampling the removed contents to determine hazardous characteristics; proper offsite treatment or disposal of removed contents; observation of the leachate seeps during maintenance (no action), ground and surface water monitoring for a 30-year maintenance period; and imposition of deed restrictions and ground water use prohibitions. The estimated present worth cost for this remedial action is $270,400 if wastes are disposed of as hazardous waste or $246,600 if disposed of as solid waste.

RECORD OF DECISION

DECLARATION

REMEDIAL ALTERNATIVE SELECTION

SITE NAME AND LOCATION

Fulbright/Sac River Landfills
Springfield, Missouri

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial actions for the Fulbright and Sac River Landfills in Springfield, Missouri. The selected remedial actions were developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300, to the extent practicable. This decision was based upon the documents and information contained in the Administrative Record for these landfills. Copies of the Administrative Record are available in the Docket Room at EPA Region VII's Office in Kansas City, Kansas, and at the Office of the City Clerk in City Hall, 830 Boonville Avenue, Springfield, Missouri.

The State of Missouri has been consulted with and concurs on the remedies selected.

DESCRIPTION OF THE SELECTED REMEDIES

The U.S. EPA, in consultation with the State of Missouri, has determined that the following actions, described and evaluated in the Feasibility Study and the Proposed Plan for remedial action (both of which are found in the Administrative Record), effectively protect public health and the environment and otherwise satisfy or meet the nine criteria established by Section 121 of SARA, for the evaluation and selection of remedial actions.

The remedial actions selected for the Fulbright/Sac River Landfills are described below:

- Drum Removal. The drums and drum remnants found in the sinkhole trench east of the Fulbright Landfill will be removed for offsite treatment or disposal. It is assumed that the contents of the drums are hazardous wastes. Chemical analyses will be conducted on the contents of the wastes in order to determine appropriate treatment or disposal. If such analyses

reveal the contents of the drums to be nonhazardous, the drums and their contents may then be disposed as solid wastes in accordance with State regulations.

- Post Closure Monitoring. Ground and surface water monitoring will be continued for both landfills. Two ground water monitoring wells at each landfill and two offsite water wells will be sampled regularly. Surface water samples will be collected regularly downstream of the landfills. Water samples collected will be analyzed for hazardous substances. Periodically, the scope (in terms of the frequency of sample collection, the number of wells sampled, and the compounds for analysis) of the monitoring program will be re-evaluated.

- Leachate Management. At the present time no specific action will be taken regarding leachate seeps. Leachate seeps have only been occasionally noted. Post-closure monitoring and maintenance for the landfills will be conducted. The need for remedial measures for leachate seeps will be periodically evaluated after review of post-closure monitoring data.

- Deed Restrictions. The landfills will remain on the State of Missouri's Registry of Hazardous Waste Sites. This will impose certain land use restrictions. In addition, EPA will require specific deed restrictions further limiting future uses of the property, to prevent or control any uses (such as buildings with basements in the waste fill) which could result in significant contaminant releases or exposures.

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to the remedial actions and is cost-effective. Section 121 of CERCLA identifies a statutory preference for treatment. Onsite treatment is not appropriate for the landfills at this time. Drums will be removed from the Fulbright Landfill sinkhole/trench for offsite management.. Treatment will be considered in lieu of disposal for the contents of these drums.

Because the selected actions result in a hazardous substance remaining onsite, a review will be conducted to assure that human health and the environment are being protected. This review

shall occur no less often than each five years after initiation of the selected actions. Sample analytical data generated in the post-closure monitoring will be used in these reviews.

9-30-88
Date

Morris Kay
Regional Administrator

Attachments: Decision Summary
Responsiveness Summary
Transcript of Public Meeting
Index to Administrative Record

RECORD OF DECISION

Fulbright/Sac River Landfills

Springfield, Missouri

Prepared by:

U.S. Environmental Protection Agency (EPA)

Region VII

Kansas City, Kansas

September 1988

Record of Decision
Decision Summary

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SECTION I - INTRODUCTION

1.1 Facility Location

The Fulbright and Sac River Landfills are located just north of the City of Springfield (the "City") in the floodplain of the Little Sac River (Figure 1). The landfills are located in a semirural area north of the City. There are no residences immediately adjacent to the landfills, but several in the general vicinity.

The land on which the landfills is located is owned by the City, which also owns much of the surrounding land, some of which is presently used by the City as a police shooting range and as an animal shelter (dog pound). The City's inactive Northwest Wastewater Treatment Plant is located immediately south of the Fulbright Landfill. Effluent from this plant's treatment of municipal sewage was discharged to Pea Ridge Creek, which drains into the South Dry Sac and Little Sac Rivers. While the remedial investigation (RI) and endangerment assessment (EA) and feasibility study (FS) were being conducted, the City completed construction of its new Northwest Wastewater Treatment Plant, located south of the Sac River Landill. Effluent from the new plant is discharged to the Little Sac River, just downstream of the Sac River Landfill. The old Wastewater Treatment Plant has been closed and no longer discharges treated effluent.

1.2 Facility History

The Fulbright and Sac River Landfills were operated by the City for the disposal of municipal and industrial solid wastes generated in the Springfield area. The Fulbright Landfill covered 98 acres and operated from 1962 through 1968. The Sac River Landfill, formerly known as the Murray Landfill, covered 114 acres and was operated from 1968 through 1974.

The EPA placed the Fulbright Landfill on its National Priorities List (NPL) of hazardous waste sites in 1981. In 1967 a death occurred at the Fulbright Landfill, when cyanide wastes were mistakenly dumped into an acid pit instead of the cyanide pit, liberating cyanide gas. The driver of the truck recovered; however, the driver's helper died.

1.3 Hydrogeologic Setting

Both landfills are located in the floodplain of the Little Sac River. The Fulbright Landfill is located along the South Dry Sac River, a tributary of the Little Sac River. The Sac River Landfill is located on the Little Sac River, just downstream of the confluence with the South Dry Sac River. Approximately 10 feet of alluvial soils were generally present at ground surface

where both landfills were located. The soil layer is thinner closer to the bluff lines forming the boundary of the floodplain. These alluvial soils, consisting of weathered limestone and clays with variable permeability, were used as daily and final cover at the landfills.

Bedrock in the vicinity is a fractured, karst limestone with sinkholes. Ground water flow in the fractured limestone tends to follow fractures ("secondary permeability"). In the floodplain the water table (upper ground water level) is generally found at a depth of 3-8 feet below ground surface, corresponding to the level of water in the adjacent river. Available data and information suggest that the upper bedrock ground water and surface water run-off from the landfills would be discharging to the adjacent (Little Sac or South Dry Sac) rivers.

Alluvial ground water and upper bedrock ground water are interconnected and are generally considered to be part of the same aquifer. The upper bedrock aquifer is not a significant ground water resource in the area, although there are a few private wells completed into the upper bedrock in the area. None of these wells are believed to be at risk of contamination by releases from the landfills.

The limestone bedrock beneath the landfills is generally abo 100 feet thick. The Northview Shale is found directly beneath the limestone and is relatively impermeable and should not allow the vertical transfer of significant quantities of water (either up or down). Beneath the Northview Shale are a series of limestone, shale, sandstone, and dolomite bedrock formations. With the exception of the shale, these are water-bearing and are known collectively as the deep bedrock aquifer. The deep bedrock aquifer comprises the most valuable ground water aquifer in the area. The City of Springfield withdraws some of its drinking water from the deep bedrock aquifer from a well upgradient of the landfills.

Ground water flow direction in the deep bedrock aquifer is to the northwest, away from the public drinking water supply and toward the landfills. This tends to reduce the potential for contamination of the water supply by any releases from the landfills. Available data also indicates that the vertical gradient is generally upward from the deep bedrock aquifer toward the surface. No downward vertical gradients were identified in the RI/FS. This tends to further reduce the potential for contamination of the deep bedrock aquifer by releases from the landfills. If uses of ground water from the deep bedrock aquifer were significantly increased, downward vertical gradients could be created.

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1.4 Enforcement History

Neither landfill was permitted or licensed by the State of Missouri, which lacked jurisdiction to regulate waste disposal when the landfills were in operation. The landfills were not regulated by EPA or the Federal Government during their operation. However, the design, construction and operation of the landfills is believed to have been typical for landfills operating during those time periods.

The City of Springfield and Litton Industries Inc. agreed to conduct the RI and the FS under the oversight of EPA. A Steering Committee was formed and headed by the City to coordinate activities among the potential responsible parties (PRPs) for the landfills. The EPA issued an Administrative Order on Consent under Section 106 of CERCLA to the City and Litton Industries as PRPs, setting forth the procedures under which the RI and FS were conducted.

At this time no administrative orders or other decrees have yet been issued on the remedial actions to be implemented. At the time such Orders or decrees have been completed they will be made part of the Administrative Record.

1.5 Landfill Operation/Waste Disposal

Generally, wastes were disposed in the landfills in the floodplain by the "trench and fill" method of landfill operation. A trench would be excavated down to bedrock, usually about 10 feet deep. Wastes, either drummed or in bulk, would then be dumped into the landfill and covered with the soil that had been excavated in the digging of the trench. Trenches generally ran perpendicular to the adjacent river. Some waste settling now makes the trenches evident. Neither landfill had an impermeable liner installed beneath the wastes, nor did either landfill have leachate collection or gas collection system or an impermeable cap, although both landfills do have a soil cover.

At the Sac River Landfill some wastes were disposed of in a former rock quarry. The "Quarry Pit" resulted from the mining of limestone and was excavated deeper into the limestone bedrock. A few dozen drums were disposed of in a sinkhole/trench on the bluff above (and east) of the Fulbright Landfill. Although now rusted and corroded, these drums appear to have been disposed of in the sinkhole after the Fulbright Landfill was closed. Wastes were also reported to have been disposed of in a small pit at the Sac River Landfill, south of the Little Sac River, near the landfill gatehouse on Highway 13. However, no physical evidence of this waste disposal was found. No evidence of waste disposal or metals contamination of ground water were noted in the geophysical survey conducted.

1.6 Community Relations

A Community Relations Plan (CRP) was developed and implemented by EPA for the landfills. The CRP can be found in the Administrative Record.

The RI Report and Endangerment Assessment was released for public review and comment. A Public Notice of the RI Report's availability was made in the Springfield Newsleader on April 28, 1988. The RI Report was made available for public review and comment in the Springfield Public Library. A Responsiveness Summary was developed on the single comment received and is found in the Administrative Record.

The Proposed Plan for remediation (PP), the Feasibility Study (FS), and the Remedial Investigation (RI) Report and Endangerment Assessment (EA) were released for 21 days of public review and comment on September 8, 1988 with another public notice in the Springfield Newsleader. The PP, FS and the RI Report and EA were placed in the Office of the Springfield City Clerk, the Springfield Public Library, and the EPA Region VII Docket Room for the public's review. The Administrative Record was placed in both the Office of the Springfield City Clerk and the EPA Region VII Docket Room.

A public meeting was held on September 19, 1988, during which oral comments on the PP, FS and RI Report and EA were received and questions on the proposed actions were responded to. In response to some of the comments received during the public meeting, EPA conducted a door-to-door survey of area residents to gauge the level of community concern. Most, but not all, residents interviewed were aware of the RI/FS conducted on the Fulbright/SAC River Landfills. None of the residents interviewed expressed serious reservations about the recommended actions.

A Responsiveness Summary has been prepared as part of this Record of Decision on the oral and written comments received on the PP, FS, and RI Report and EA.

SECTION II - SITE CHARACTERISTICS

2.1 Remedial Investigation - Objectives

The EPA prepared the RI/FS Workplan, which the City and Litton Industries, Inc. (the PRPs) implemented under EPA oversight. Subsequent plans, such as the health and safety plan and the quality assurance project plan, were developed by the PRPs and approved by EPA. The Objectives of the RI were to: 1) identify contaminants present in the wastes which might be released into the environment; 2) determine the hydrogeologic setting of the landfills; 3) Identify potential routes of contaminant release and the ultimate fate of any contaminants released from the landfills; and 4) evaluate potential human exposure from releases from the landfills and adverse environmental impacts.

2.2 Remedial Investigation Activities

The RI field work, performed by the PRPs in 1986 and 1987 under EPA oversight, included the following activities.

-A geophysical investigation was conducted using remote sensing techniques. Electromagnetic measurements and resistivity soundings were taken over both landfills. The purposes of the geophysical investigations were; to tentatively identify depth to bedrock and fill depth, to provide some information on subsurface soils types, to identify any plumes of metal contamination in shallow ground water, and to locate large deposits or concentrations of buried drums. The results of the geophysical investigation were then used to select locations for monitoring well installation.

-A series of alluvial and shallow bedrock ground water monitoring wells were installed to detect releases of contamination in ground water. Ground water samples were collected for chemical analyses.

-Several leachate seeps were sampled for chemical analysis.

-Surface water and sediment samples were collected from the adjacent river and were analyzed for hazardous substances.

-Ground water elevations were measured in the monitoring wells to determine directions and patterns of ground water flow.

-Drum remnants and contaminated soil from the sinkhole/trench on the bluff above the Fulbright Landfill (the only known location of surface drums) were sampled and analyzed.

2.3 Remedial Investigation Results

Contaminant concentrations in the environmental media sampled (soil, ground water, leachate, surface water, and sediments) were relatively low. Contaminant concentrations in the environmental samples collected are summarized in detail in the RI Report.

Using the analytical data from the RI Report and available hydrogeologic data and information, estimates were then made on contaminant concentrations at expected or potential "points of use". These calculations can be found in the Endangerment Assessment portion of the RI Report.

Three endangered species have been reported by the U.S. Fish and Wildlife Service in the vicinity: Bald Eagle (Haliaeetus leucocephalus), Gray Bat (Myotis grisescens), and Missouri Bladderpod (Lesquerella filiformis). Two additional threatened species are present in the area: Niangua Darter (Etheostoma nianguae) and Ozark Cavefish (Amplyopsis rosae). It is not expected that contaminant releases from the landfills will have any measurable adverse impact on the endangered and threatened species.

SECTION III - SITE RISKS

3.1 Potential Site Risks

When the Fulbright Landfill was placed on the NPL, it was believed by EPA that wastes in the landfill potentially posed the following risks.

-The wastes disposed could result in contamination of both shallow and deep ground water. Since the directions of ground water flow and vertical gradients were not known or fully understood, it was assumed that all area ground water might be at risk. Actual ground water contamination could have precluded future uses of ground water.

-The disposed wastes could also contaminate the adjacent South Dry Sac River and the Little Sac River. Potentially adverse impacts on water quality and fishing and recreation were a concern.

-Very little historical information was available on the operation of the landfills (i.e. the specific methods of waste disposal). It was not known whether wastes or drums might still be at or near the ground surface posing potential direct contact exposure hazards. In addition, it was suspected that contaminated leachate seeps might pose a direct contact threat and release contaminants to the ground or surface water.

-Although surrounding land uses and the potential for human pedestrian traffic onsite was generally known before the RI/FS was begun, little or no information was available about wildlife or endangered or threatened species which might have been at risk from contaminants released from the landfills.

Review of the data and information provided in the RI and FS has now greatly expanded EPA's knowledge about the site. Analytical or hydrogeological data about the landfills has eliminated many of the concerns related to potential endangerment. For example, the direction of ground water flow is to the northwest, which is <u>not</u> toward the public drinking water supply. For much of the area the vertical hydraulic gradient appears to be upward, not down. Contaminant concentrations found in the soil, ground water, surface water, and sediments were all relatively low. Leachate seeps occur infrequently, and in small quantities with very low levels of contamination. A few private drinking water wells were found during the ground water use survey. None of these wells appear to be at risk of contamination by the landfills.

The EPA has determined the contaminant concentrations in all media sampled do not represent an immediate threat to human health or the environment.

3.2 Current Site Risks

Based upon data from the RI, environmental contaminant concentrations do not exceed applicable or relevant and appropriate requirement standards for a realistic worst-case scenario. Current and future site risk were evaluated in detail in the Endangerment Assessment Chapter of the RI Report. The endangerment of human health or the environment at the landfills are described below.

-Industrial wastes, some of which contain hazardous substances, remain in the landfills beneath the cover. If the cover is damaged or erodes, these wastes may be exposed, increasing the potential for direct contact exposures and releases to the environment (ground water, air and surface water).

-Additional withdrawals of ground water from public or private drinking water wells could potentially alter the ground water flow and subsequent risk of contamination. However, current data indicate that a change the direction of ground water flow alone would probably not result in significant endangerment. Contaminant concentrations so far detected would be diluted below any health related standards or criteria before they reached a drinking water well. Higher levels of contamination in ground water alone, would also not necessarily result in significant endangerment, since there is no current down-gradient ground water usage at risk.

-There is currently no prohibition against the drilling and use of new wells for drinking water at or near the landfills, where contaminant concentrations might exceed those which would be acceptable or recommended for drinking purposes.

-Drum remnants and waste residuals were identified in a sinkhole on the bluff above (and east of) the Fulbright Landfill. Due to the difficulty and hazards associated with sampling in such confined spaces, adequate samples could not be collected for complete characterization of the levels of contamination. Contaminant concentrations in some of the less accessible portions of the sinkhole could still pose a direct contact threat and potentially release contaminants into the environment.

-Several leachate seeps were noted, especially during wet weather. The leachate seeps have the potential to result in direct contact exposures and also contribute to contaminant

levels in the river. Current data indicates the contaminant levels in the leachate seeps do not exceed applicable criteria or standards. However, future releases could contain elevated contaminant concentrations, resulting in direct contact exposures risks.

SECTION IV - DOCUMENTATION OF SIGNIFICANT CHANGES

Section 117(a) of CERCLA/SARA requires that a Proposed Plan for remedial action (PP) be prepared by EPA and released with the Feasibility Study (FS) for public review and comment. The PP highlights key information from the RI and FS Reports, briefly describes the alternatives for site remediation and identifies preferred alternatives and rationale. EPA released the PP and the FS, along with the RI Report and EA, for public review and comment on September 8, for a 21-day comment period.

Section 117(b) of CERCLA/SARA further requires that any changes in the remedy or response actions selected in the final remedial action plan, that differ from those recommended in the PP, be described along with the reasons for such changes. The response actions recommended in the PP are the same as those which are selected in this final remedial action plan. However, EPA notes that the two surface water sampling points discussed in the FS for the Intermediate Ground and Surface Monitoring Alternative (C.2 of the PP) were inadvertently omitted from this alternative in the PP. This alternative was selected as the preferred alternative in the PP, including the two downstream surface water sampling points.

SECTION V - DESCRIPTION OF ALTERNATIVES

Alternative response actions were developed to respond to each of the problems representing a potential endangerment at each of the landfills. The EPA considered alternatives not discussed in the FS: 1) Complete waste excavation and removal for offsite treatment or disposal in lieu of site-use restrictions; 2) Complete waste removal for offsite disposal or treatment to control leachate seeps. Although these alternatives were considered, they are not preferred EPA.

5.1 Fulbright Sinkhole and Trench Drums

Five alternatives were identified as potentially applicable for the drums in the Fulbright sinkhole and trench.

-No-action.

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-Excavation for disposal/management as hazardous waste.
-Excavation for disposal/management as solid waste, if subsequent sampling and analysis characterized the waste as non-hazardous.
-In-place soil cover.

5.2 Leachate Seeps

Five potentially applicable alternatives were identified for the leachate seeps on the ground surface and in the river banks at both landfills.

-No-action.
-Seep isolation barriers (such as rocks or geotextile membranes).
-Upgradient collection/interception.
-Downgradient leachate collection and treatment.
-Complete waste excavation and removal for disposal/treatment.

5.3 Ground and Surface Water Monitoring

Four alternatives were identified as potentially applicable for ground and surface water monitoring at both landfills.

-Extensive ground and surface water monitoring (periodically collecting water samples from all onsite monitoring wells, from two nearby offsite wells, and up and downstream in the adjacent river and analyzing for all hazardous substances).

-Intermediate ground and surface water monitoring (periodically collecting and analyzing water samples for pertinent fractions of the hazardous substances from two monitoring wells at each landfill, from two additional nearby wells, and from the adjacent river just downstream of each landfill).

-Limited monitoring (periodically collecting and analyzing downstream surface water samples for some hazardous substances).

-No-action (other than monitoring of the adjacent river for the discharge from the wastewater treatment plant).

5.4 Site Use Restrictions

Three alternatives were identified as potentially applicable for site use restrictions, including restrictions to prevent; direct contact exposures, the drilling of additional wells at the landfills, and the consumption of potentially contaminated ground water.

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-No-action (The landfills would still be on the Missouri Registry of Hazardous Waste Sites, which would provide certain protections and limitations on changes in land use.)

-Deed restrictions/ground water use prohibitions/recommendations.

-Complete removal of all hazardous wastes and wastes containing hazardous substances for offsite disposal or management (in lieu of any access restrictions and including removal from the Missouri Registry).

SECTION VI - SUMMARY OF THE COMPARATIVE ANALYSIS OF THE ALTERNATIVES

The alternatives described in Section 5 were evaluated using criteria presented in EPA Directive 9355.02, Draft Guidance on Preparing Superfund Decision Documents: The Proposed Plan and Record of Decision". These criteria relate to factors mandated in Section 121 of CERCLA/SARA, and considerations of the overall feasibility and acceptability of the remedy. The nine criteria are as follows.

-Protection of human health and the environment.
-Compliance with applicable, or relevant and appropriate regulatory requirements (ARARs).
-Long-term effectiveness and permanence.
-Short-term effectiveness.
-Reduction of (waste) toxicity, mobility, or volume.
-Implementability.
-Cost.
-State acceptance.
-Community Acceptance.

To some extent the problems and potential response actions (alternatives) are independent of each other and were therefore evaluated separately. For example, response actions taken for the drum remnants in the Fulbright sinkhole have no direct bearing on response actions for the leachate at both Landfills. Also, some ground and surface water monitoring needed to be considered whether or not the leachate was controlled or captured at this time.

As required by law, the no-action alternative is retained, even when it does not accomplish the remedial objective identified, to establish a baseline comparison.

Table 1 screens and evaluates the potentially applicable response action alternatives for each problem statement. A brie statement of the goals and objectives for each problem statement is also included in Table 1. (Refer to Table 1 for numbering identification of the alternatives discussed below.)

6.1 Fulbright Sinkhole and Trench Drums

Alternative A.2, Excavation and Disposal (or Treatment) as a hazardous waste, is the recommended alternative. Of the three alternatives accomplishing the remedial objectives, this alternative affords the greatest degree of protection and would be most certain of accomplishing this objective. This alternative also meets applicable or relevant and appropriate requirements (ARARs), and is most effective for both the short and long term. It is preferred over Alternative A.2, Excavation and Disposal as a solid waste, because it is probable that when fully characterized at least some of the wastes would be hazardous and would still have to be managed as a hazardous waste. If sampling and analyses reveals these wastes to be nonhazardous, they could still be managed as solid, nonhazardous wastes in compliance with State regulations under the recommended alternative (A.2). In practical application Alternative A.2 will differ little, if at all, from Alternative A.3.

6.2 Leachate Seep Control

Alternative B.1, No-Action, is the preferred alternative. EPA believes it is preferable to address any seeps at either landfill which need control in a post-closure monitoring and maintenance plan. If large or enduring seeps are noted in post-closure monitoring, it would then be more appropriate to consider control measures, and possibly additional access restrictions. Controls such as the rock barriers discussed in Alternative B.2 might then be considered for implementation.

Although Alternative B.2, Seep Isolation Barriers, appears to afford a higher degree of protection of public health, EPA notes that under present use conditions the leachate does not pose a significant threat to health or the environment. Seeps have only been occasionally noted. EPA is concerned about the poor effectiveness of Alternative B.2. Even after covering all currently existing seeps, additional seeps could always develop. Also any seeps now existing only occasionally occur. A more effective means of preventing potential direct contact exposures would be to address them as part of post-closure monitoring and maintenance. Alternative B.3, Upgradient leachate collection Interception Barrier, is rejected because it would not effectively accomplish the remedial objectives and because of costs. Alternative B.4, Complete Waste Excavation and Removal for Offsite Disposal/Treatment, is rejected because of poor implementability, the hazards related to excavation and waste handling, and costs. Since the landfills have been closed for over 14 years, records regarding the chemical nature of all wastes disposed are not available. It would have to be assumed that a wide variety of potentially incompatible wastes are present in the landfill, although soluble contaminants are apparently not being released in significant quantities. It is

unlikely that any single treatment or disposal process would be suitable for all of the wastes if excavated. Multi-stage processes for treatment and disposal would have to be considered.

6.3 Ground and Surface Water Monitoring

EPA recommends Alternative C.2, the Intermediate Level of Monitoring, as the preferred alternative for both landfills. Alternative C.1 might appear to provide greater protection of public health and the environment. However, given the very low contaminant levels so far found in the environmental samples collected, Alternative C.2 provides sufficient early warning of any potentially significant changes in ground water quality. The EPA notes that the rates and patterns of ground water flow are likely to be more important determinants of any increased potential endangerment than ground water contaminant concentrations. Alternatives C.3 and C.4 do not provide sufficient data to identify trends or changes in surface or ground water flow or quality and resultant impacts on endangerment. Although C.2 is selected for the initial phases of monitoring it will eventually be appropriate to re-evaluate the scope of the continued monitoring, based upon the data received and reviewed.

6.4 Site Use Restrictions

EPA recommends Alternative D.2, Deed Restrictions/Ground Water Use Prohibitions. Alternative D.1, No-Action/Missouri Registry, also provides much of the same protection. However, D.2 is more specialized to the needs of these landfills and is preferred over D.1 for that reason. Alternative D.3, Complete Waste Removal, is rejected on the basis of the difficulty of implementation, the associated hazards to health and the environment, and because of costs.

In selecting D.2, EPA will require deed restrictions on the City property on which the landfills are located. EPA has required similar deed restrictions on other sites. At the present time EPA does not see a need for any deed restrictions on the surrounding property, not owned by the City. EPA would recommend that the State and local authorities be used to control or prevent the drilling of any new wells on such adjacent or nearby properties for drinking water unless the water is initially and periodically tested for contamination. Any new wells drilled, should be properly installed and cased in order not to create new avenues for contaminant release to ground water.

SECTION VII - SELECTED ALTERNATIVES

EPA reviewed the data and information from the RI Report and Endangerment Assessment, the Feasibility Study, and other relevant data and information in the evaluation of the potentially applicable alternatives. The following are the alternatives selected for the Fulbright /Sac River Landfills.

7.1 Fulbright Sinkhole and Trench Drums

The contents of the sinkhole and associated trench on the bluff above the Fulbright Landfill shall be removed. Sampling and analysis of the contents of the sinkhole shall be conducted in order that the wastes or materials excavated can be safely disposed. It will be assumed that the wastes are hazardous and must be disposed as hazardous wastes. However if review of analytical data on the samples collected indicates the contents of are nonhazardous, they may then be disposed as solid wastes in accordance with State regulations.

7.2 Leachate Seeps

No remedial actions will be taken on leachate seeps at this time. The need for remedial actions for leachate at the landfills will be periodically re-evaluated upon review of post-closure monitoring and maintenance data and information.

7.3 Ground and Surface Water Monitoring

The intermediate level of ground and surface monitoring shall be conducted. This will include periodic sampling of two monitoring wells at each landfill, two nearby offsite wells, and sampling of the adjacent river just downstream of each landfill. Water samples collected will be analyzed for pertinent fractions of the hazardous substances list.

7.4 Site Use Restrictions

Deed restrictions will be required on the City property containing the landfills. The restrictions will prevent or safely control future uses of the property which could result in direct contact exposures or result in significant contaminant releases to the environment. It is recommended that State and local authorities be considered for preventing or controlling the drilling of new wells for drinking on nearby property not owned by the City.

SECTION VIII - STATUTORY DETERMINATIONS

Based upon all of the available information, the selected actions satisfy the remedy selection requirements under CERCLA/SARA and the NCP. The actions provide protection of public health and the environment, meet all applicable or relevant and appropriate requirements, and is cost-effective. Innovative treatment technologies will be given preference when evaluating options for the disposal of the drum remnants from the Fulbright sinkhole, as well as any leachate collected, if ever necessary.

To the extent practical the remedy is also permanent. However, it is quite appropriate at this site that post-closure monitoring of ground and surface water be provided. Such data will provide the basis for the 5-year evaluations mandated by SARA for sites such as these landfills.

SECTION IX - IMPLEMENTATION

The response actions selected by this Record of Decision will not be initiated before December 1988.

The Regional Administrator retains the authority to make changes in the scope and nature of the actions undertaken at either of the landfills. If new information or additional environmental data is received by EPA, the selected actions will be reviewed and additional response actions will be considered in light of the new information or data.

Figure 1, AREA MAP

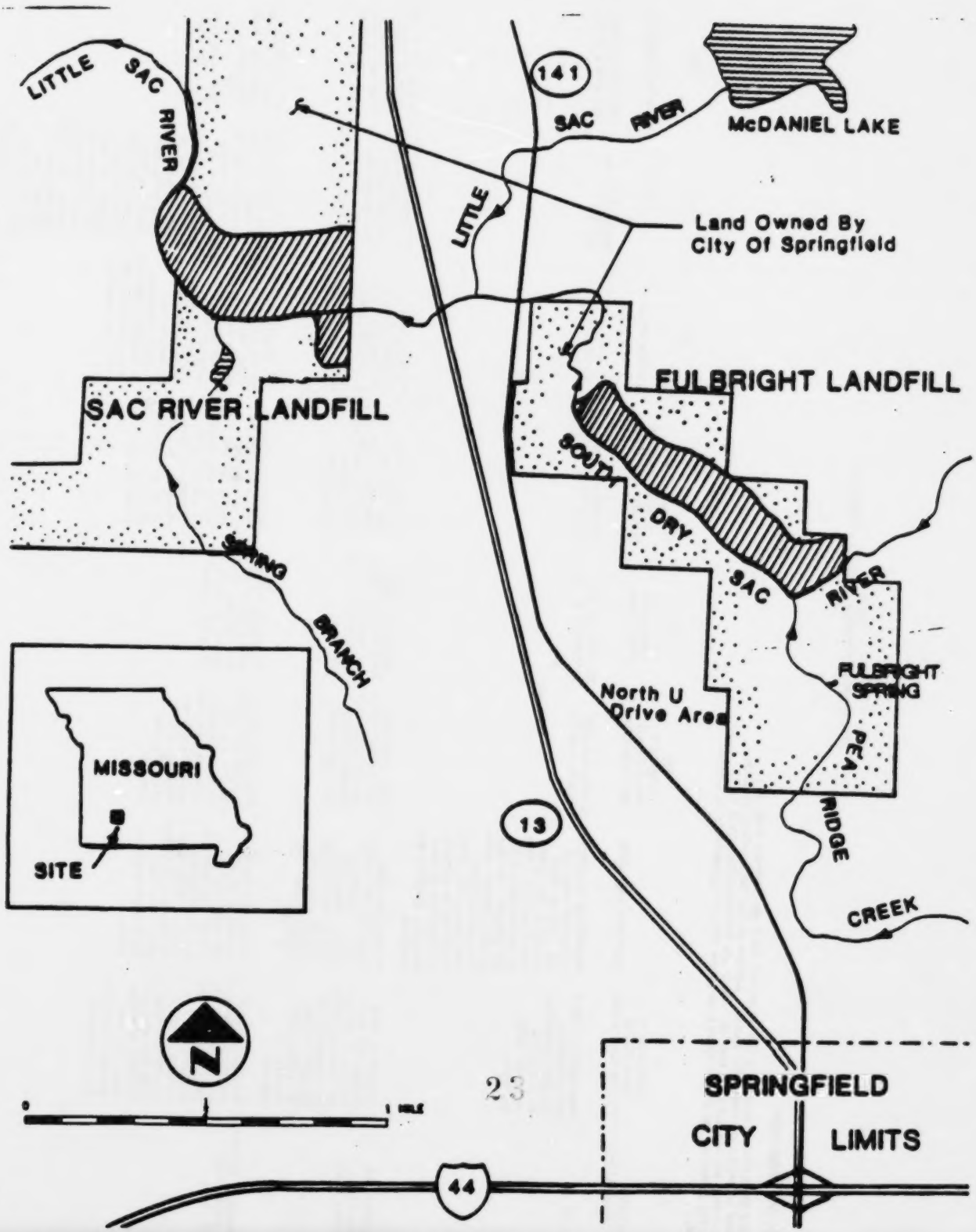

Table 1
EVALUATION OF POTENTIAL RESPONSE ALTERNATIVES

SINKHOLE AND TRENCH DRUMS

Goals and Objectives: Samples collected around the drums indicate they once contained hazardous or industrial wastes. Because of the inaccessible location of the drums, not all could be sampled. The goals and objectives would be to remove the potential for direct contact exposures with the potentially hazardous contents.

Potential Response Alternatives	I Protection of Human Health and the Environment	II Compliance with ARARs	III Long-Term Effectiveness and Permanence	IV Short-Term Effectiveness	V Reduction of (Waste) Toxicity Mobility and Volume	VI Implementability	VII Cost	VIII State Acceptance	IX Community Acceptance
No Action	Unacceptable--Would not accomplish remedial objectives of preventing potential human exposures	Potentially acceptable --Adequate sampling and analyses might determine that potentially harmful levels of contaminants are not present. However, without adequate sampling and analysis, compliance with ARARs could not be assured. Unacceptable without adequate sampling and analysis.	NA--Did not meet criteria I or II.	NA--Did not meet criteria I or II.	NA--Did not meet criteria I or II.	NA--Did not meet criteria I or II.	Obviously least costly.	N/A--Did not meet criteria I or II.	NA--Did not meet criteria I or II.
Excavation and Disposal as Hazardous Waste	Acceptable--With appropriate protection of personnel removing drums, the potential for exposure to contaminated drum contents is removed.	Acceptable--ARARs would be RCRA definition of hazardous waste. Materials removal would be managed as hazardous waste in compliance with RCRA.	Acceptable--Once removed and safely managed, potential threats at this site are removed.	Acceptable--When contaminated wastes are removed, threat of exposure is also removed.	Acceptable--However, no real reduction in waste toxicity, mobility or volume is accomplished.	Implementable--Although relative inaccessability of the sinkhole may slow up this alternative's implementation.	Present worth costs estimated at $60,400 (intermediate of the alternatives meeting criteria I and II).	EPA believes the State of Missouri would find this alternative the most acceptable.	EPA believes the Springfield community would find this to be acceptable and the most preferred of the three alternatives meeting criteria I and II.
Excavation, Analysis and Disposal as Solid Waste	Acceptable--With appropriate personnel protection, the potential for human exposure is removed. With appropriate sampling and analysis, disposal as solid waste will not endanger health or the environment.	Acceptable--Materials removed would be characterized to assure that they are not RCRA hazardous wastes. Would then be disposed in accordance with state solid waste regulations.	Acceptable--Once removed and safely managed (as non hazardous wastes after sampling and analysis) potential threats at this site are removed.	Acceptable--When contaminated wastes are removed, the threat of exposure are also removed.	Acceptable--The remedial objective of protecting health and the environment would be accomplished. However, no real reduction in waste toxicity, mobility or volume is accomplished.	The inaccessibility of the sinkhole will limit implementability of this alternative. Until material has been sampled and analyzed, personnel conducting the removal would have to proceed under the assumption that the wastes are hazardous.	Uncertain at this time because contaminant level of the wastes has not been determined. If analysis of wastes determines that disposal as solid wastes is acceptable, then costs are estimated at $47,100 (less than A.2). However, if analysis warrants disposal as hazardous wastes, then costs are estimated at $70,900 (the greatest of the three alternatives meeting criteria I and II).	EPA believes the State of Missouri would find this alternative slightly less preferable than A.2., but still acceptable.	EPA believes the community would accept this alternative but would prefer Alternative A.2.

Table I
(continued)

Potential Response Alternatives	I Protection of Human Health and the Environment	II Compliance with ARARs	III Long-Term Effectiveness and Permanence	IV Short-Term Effectiveness	V Reduction of (Waste) Toxicity Mobility and Volume	VI Implementability	VII Cost	VIII State Acceptance	IX Community Acceptance
Soil Cover	Acceptable--Soil cover can effectively remove the potential for exposures, as long as the cover installed remains intact.	Acceptable--Wastes were disposed of prior to effective dates of RCRA. If left in place wastes are not subject to RCRA regulations.	Less effective than A.2 or A.3. Soil cover would require continued maintenance to assure effectiveness.	Acceptable--In the short term soil cover effectively removes potential exposures.	Acceptable in that the Remedial Objectives may be accomplished. However, no real reduction of toxicity mobility and volume will be obtained.	The most easily implemented of the four alternatives. The inaccessibility of the sinkhole has less effect on the soil cover because the inaccessible reaches of the sink hole would simply be filled with soil.	Including operation and maintenance (O&M) present worth, costs are estimated at $2,700 approaching those of A.2 and A.3.	EPA believes the State of Missouri would find this alternative acceptable but less preferable than A.2 because of the need for continuing O&M.	EPA believes the communities would be less likely to accept this alternative than either A.2 or A.3.

Table I
(continued)

LEACHATE SEEP CONTROL

Goals and Objectives: Assuming seeps contain potential toxic levels of contamination, remove potential for humans and wildlife direct contact exposures.

Potential Response Alternatives	I Protection of Human Health and the Environment	II Compliance with ARARs	III Long-Term Effectiveness and Permanence	IV Short-Term Effectiveness	V Reduction of (Waste) Toxicity Mobility and Volume	VI Implementability	VII Cost	VIII State Acceptance	IX Community Acceptance
No Action	Acceptable--With institutional controls on current and future land uses, the remedial objectives can be met.	Acceptable--With institutional land use controls.	Acceptable--Unless new leachate seeps were to develop, containing high concentrations of contaminants in areas accessible to direct contact exposures.	Acceptable--With land use controls.	No real reduction in waste toxicity, mobility, or volume. However, may still meet remedial objective.	Should be easily implementable, although institutional controls (i.e., no trespassing or warning signs) could be ignored resulting in short term exposure. No continued or long term exposure would be expected.	Zero, except for administrative costs if institutional controls implemented.	EPA believes that the State of Missouri would accept this alternative.	EPA does not know what the community would accept and is soliciting comment.
Install Seep Isolation Barriers	Acceptable--Even without institutional controls on current and future land use, the remedial objectives can be accomplished.	Acceptable--Even without institutional land use controls.	Acceptable--Unless new leachate seeps were to develop after completion of the remedial action and were not isolated.	Acceptable--Even without land use controls.	No real reduction in waste toxicity, mobility, or volume. However may still meet remedial objective.	May be difficult to accomplish remedial objectives because seeps to be covered may be hard to find and may not exist at the time the cleanup is conducted.	Present worth costs (including O&M) estimated at $368,100.	EPA believes that the State of Missouri would accept this alternative but might question whether the costs are warranted and might, therefore, prefer Alternative B.1.	EPA does not know what the community would accept and is soliciting comment.
Upgradient Collection Interception Barrier	Unacceptable--Although some leachate recharge could be collected, reducing leachate generation, it is doubtful that leachate seeps could be eliminated.	Does not meet criterion, but would be acceptable with institutional land use controls.	NA--Does not meet criterion, but would be acceptable with institutional land use controls.	NA--Does not meet criterion, but would be acceptable with institutional land use controls.	NA--Does not meet criterion, but would be acceptable with institutional land use controls.	NA--Does not meet criterion, but would be acceptable with institutional land use controls.	Not costed out because criterion not met.	EPA believes that the State of Missouri would agree that this alternative is unacceptable without land use controls.	EPA does not know what the community would accept and is soliciting comment.

Table I
(continued)

Potential ponse Alternatives	I Protection of Human Health and the Environment	II Compliance with ARARs	III Long-Term Effectiveness and Permanence	IV Short-Term Effectiveness	V Reduction of (Waste) Toxicity Mobility and Volume	VI Implementability	VII Cost	VIII State Acceptance	IX Community Acceptance
Downgradient Leachate Collection and Treatment	This alternative would only be effective for surface seeps, not for seeps occurring along the river bank. The alternatives would, therefore, meet the remedial objective only for surface seeps and would have to be combined with other alternatives for seeps along the river bank.	Acceptable--For surface seeps only (without institutional controls) unless implemented with other response actions for river bank seeps.	Acceptable for surface seeps. Performance will depend on O&M for collection and treatment systems. Same limitations as 8.1 and 8.2 if new seeps were to develop after remedy implementation.	Acceptable--For surface seeps only.	Treatment technologies could be selected which could reduce waste toxicity, mobility, and volume. Again, only effective for surface seeps.	Very difficult to implement. Seeps noted at site tend to occur quite a distance from each other. Extensive collection system might be required to route leachate collected from various seeps to common treatment unit. Alternatively, separate treatment systems could be installed, especially if leachate varies in contaminant type from one seep to another. Would still require combination with other response actions (i.e., 8.2) for river seeps.	Potentially (depending on variation in leachate character from one seep to another) one to several orders of magnitude more costly than next most costly alternative.	EPA believes the State of Missouri would be unlikely to accept this remedy because of its complexity and costs and would prefer 8.1, 8.2, or 8.3.	EPA does not know what the community would accept and is soliciting comment. However, members of the technologies that might be considered would probably pre for it. EPA is soliciting comment.
Complete Removal of All Hazardous and Solid Wastes for Treatment or Redisposal (Offsite) as Hazardous Wastes (As an alternative to the need for leachate management, all of the wastes would have to be excavated and removed for offsite treatment or disposal.	Acceptable--with the caveat that opening the landfill for waste excavation is potentially the most hazardous action which could be considered. Extraordinary care must be taken to protect the personnel doing such removal. In addition, extraordinary measures will be required to prevent contaminant releases into the ground or surface water during waste removal, handling, and transportation.	Acceptable--With caveats under Criterion I.	If effectively implemented, the most acceptable alternative.	Unless extraordinary measures are implemented, the short-term effectiveness could be extremely negative. Given that a variety of waste conditions may be encountered, it may not be possible to anticipate and develop effective contingency plans for all such conditions.	No real reduction in waste toxicity volume, or mobility would be realized if the wastes are redisposed elsewhere. Treatment options could be considered which would reduce waste toxicity, mobility, and volume.	This alternative may not be implementable. A variety of incompatible wastes could be encountered. Multi-stage treatment of the materials excavated might also be required.	Exorbitant, likely to be many orders of magnitude above all other response actions combined.	EPA believes that the State, recognizing the hazards associated with the excavation and handling of potentially hazardous, but as yet uncharacterized wastes, would find this alternative unacceptable.	EPA believes that The community would probably be more likely than EPA or the State to accept this alternative. However EPA is soliciting comment.

Table I
(continued)

**OUND AND SURFACE
ATER MONITORING**

ols and Objectives: Monitor contaminant concentrations as evidence of contamination leased from site. Evaluate associated risk and potential for use restrictions on ter to be lifted.

Potential nse Alternatives	I Protection of Human Health and the Environment	II Compliance with ARARs	III Long-Term Effectiveness and Permanence	IV Short-Term Effectiveness	V Reduction of (Waste) Toxicity Mobility and Volume	VI Implementability	VII Cost	VIII State Acceptance	IX Community Acceptance
tensive Ground and rface Water Moni- ring (All RI/FS nitoring wells us two offsite lls for all HSLs)	Acceptable--Given physical limita tions of attempting to monitor a frac tured bedrock unit (i.e., groundwater tunnels to flow via the fractures.)	Acceptable	Acceptable	Acceptable--Given the limitations of a data base with only limited data available.	Not applicable to monitoring.	Fully implementable using existing moni toring wells. High river stage may temporarily prevent collection of sur face water samples. Alluvial wells, may occasionally be dry, preventing collec tion of groundwater samples.	Present worth analysis estimated at $820,100 for 30 years of moni toring.	EPA believes the State of Missouri would accept this alternative.	EPA believes the com munity would prefer this alternative over the other three and is soliciting comment.
termediate lected RI/FS nitoring wells and lected 2 offsite rface water wells r rotating frac ons of HSLs)	Acceptable, al though theoreti cally there is some risk of increased endangerment, resulting from releases that would be detected in C.1, but not in C.2.	Acceptable	Acceptable, assum ing the monitoring program selected is representative of the aquifer sampled.	Acceptable--Given the limitations of a data base with only limited data available.	No applicable to monitoring.	Fully implementable using existing moni toring wells. High river stage can temporarily prevent collection of sur face water samples. Alluvial wells may occasionally be dry, preventing col lection of ground water samples.	Present worth anal ysis for 30 years of monitoring esti mated at $190,500.	EPA believes the State of Missouri would accept this alternative and would prefer it over C.1 because it is likely to be more cost effec tive.	EPA believes the com munity would accept this alternative, but would prefer C.1. EPA is soliciting comment.
ited (downstream rface water for e HSLs)	Not acceptable-- Does not accomplish the remedial objec tives and does not provide a data base sufficient to eval- uate contaminant releases and accept ability of future uses.	Not acceptable.	Not acceptable.	Not acceptable.	Not applicable to monitoring.	Not applicable.	Considerably less (several orders of magnitude) than Alternatives C.1 or C.2	EPA believes the State of Missouri would not accept this alternative because sufficient data to monitor trends would not be generated.	EPA believes the com munity would not accept this alterna- tive but is soliciting comment.
Action (No ground surface water nitoring other an that required r the adjacent atewater treatment lant.)	Not acceptable. Does not accomplish the remedial objec tives and does not provide a data base sufficient to eval uate contaminated releases and accept ability of future uses.	Not acceptable.	Not acceptable.	Not acceptable.	Not applicable to monitoring.	Not applicable.	Zero.	EPA believes the State of Missouri would not accept this alternative because sufficient data to monitor trends would not be generated.	EPA believes the com munity would not accept this alterna- tive but is soliciting comment.

Table I
(continued)

Potential nse Alternatives	I Protection of Human Health and the Environment	II Compliance with ARARs	III Long-Term Effectiveness and Permanence	IV Short-Term Effectiveness	V Reduction of (Waste) Toxicity Mobility and Volume	VI Implementability	VII Cost	VIII State Acceptance	IX Community Acceptance
TE USE RESTRICTIONS									
als and Objectives: Prevent direct contact exposures with wastes or contaminants the site. Prevent consumption of potentially contaminated groundwater, and to vent changes in land use which could increase contaminant releases from the site increase the potential for exposure to contaminants.									
Action (Missouri gistry)	The landfills are already on Missouri's Registry of Hazardous Waste Sites, which limits certain types of changes in land use.	Not applicable.	Marginally less effective than B.2.	Acceptable in the short term.	Not applicable.	Already implemented.	Zero.	EPA believes the State of Missouri would find this alternative less acceptable than B.2.	EPA believes the community would find this alternative less acceptable than B.2. EPA is soliciting comment.
ed Restrictions d Groundwater Use rohibitions	Deed restrictions formalizing procedures for changes in land uses would be obtained. On site use of ground water for consumption would be prohibited. Slightly better protection of human health is obtained from the more formal and specific deed restrictions.	Not applicable.	In the long term, deed restrictions would be more effective than alternative B.1.	Equally as acceptable in the short term as B.1.	Not applicable.	Easily implemented. EPA has obtained similar restrictions on other sites.	Zero, except for administrative costs of obtaining deed restrictions.	EPA believes the State of Missouri would find this alternative more acceptable than B.1 because the use restrictions will be more specific and comprehensive. EPA is soliciting comment.	EPA believes the community would find this alternative more acceptable than B.1 because the use restrictions will be more specific and comprehensive. EPA is soliciting comment.
mplete Removal of ll Hazardous and olid Wastes for reatment or Redisposal (Offsite) as azardous Wastes (As n alternative to he need for land se restrictions and long-term monitoring, all of the astes would have to e excavated and emoved for offsite reatment or disposal. fter such removal, nce residual contaminant levels in roundwater have been reduced to cceptable levels, monitoring and use restrictions could be discontinued.)	Acceptable with the caveat that opening the landfill for waste excavation is potentially the most hazardous action which could be considered. Extraordinary care must be taken to protect the personnel doing such removal. In addition, extraordinary measures will be required to prevent contaminant releases into the ground or surface water during waste removal, handling, and transportation.	Acceptable--With caveats under Criterion I.	If effectively implemented, the most acceptable alternative of B and C alternatives.	Unless extraordinary measures are implemented, the short-term effectiveness could be extremely negative. Given that a variety of waste conditions may be encountered, it may not be possible to anticipate and develop effective contingency plans for all such conditions.	No real reduction in waste toxicity, volume, or mobility would be realized if the wastes are redisposed elsewhere. Treatment options could be considered which would reduce waste toxicity, mobility, and volume.	This alternative may not be implementable. A variety of incompatible wastes could be encountered. Multi-stage treatment of the materials excavated might also be required.	Exorbitant, likely to be many orders of magnitude above all other response actions combined.	EPA believes that the State, recognizing the hazards associated with the excavation and handling of potentially hazardous, but as yet uncharacterized wastes, would find this alternative unacceptable.	EPA believes that the community would probably be more likely than EPA or the State to accept this alternative. However, EPA is soliciting comment.

RESPONSIVENESS SUMMARY

Record of Decision for
Fulbright/Sac River Landfills
Springfield, Missouri

This Responsiveness Summary presents the responses of the Environmental Protection Agency (EPA) to public comments received regarding the proposed remedial actions for the Fulbright and Sac River Landfills in Springfield, Missouri. This document addresses all comments received by the Agency during the public comment period conducted as part of the remedy selection process.

A remedial investigation/feasibility study (RI/FS) was conducted on the landfills by the potentially responsible parties (PRPs) under EPA oversight. A Proposed Plan was developed by EPA, which made recommendations on the remedial actions for the landfills. The RI/FS report and the Proposed Plan were released for public review and comment for a 21 day period which began on September 8, 1988 with a public notice in the Springfield News Leader. A public meeting was held in Springfield at the City Hall on September 19, 1988 at 7:00 p.m. A number of verbal comments from the public were received by EPA during that public meeting.

The following are the substantive public comments, and EPA's response, to the RI/FS and the Proposed Plan.

Comment: A commenter stated that the individuals who actually conducted the RI/FS, the City and generators of wastes disposed in the landfills, had motivation not to find any problems at the landfills in order to limit their liability.

EPA Response: Potentially responsible parties (PRPs), such as the owners of the site or the generators of the wastes disposed, do sometimes have a motivation to not identify problems at a site. For this reason EPA oversees such efforts closely, as required by the Superfund Amendments and Reauthorization Act (SARA). On this RI/FS, EPA actually developed the RI/FS workplan. Subsequent plans were developed by the PRPs with substantial EPA review and approval. Field work was witnessed or overseen by EPA or EPA contractors. In EPA's opinion, the RI/FS was properly and professionally conducted.

Comment: The same commenter asked whether or not the RI/FS was conducted by an "uninterested party". The same commenter asked why the City and Litton Industries were selected to conduct the RI/FS.

EPA Response: The RI/FS was conducted by the City, as the owner of the landfills, and some of the generators of wastes disposed in the landfills. These are, of course, not disinterested

parties. EPA is statutorily required to offer the opportunity to conduct the RI/FS, as well as other response actions, to potentially responsible parties (PRPs). The EPA had identified the City and Litton as PRPs and notified them of their potential liabilities for the landfills and that an RI/FS would have to be conducted, if not by them, then by EPA. As potentially responsible parties they could be liable for the costs of EPA's RI/FS if they refused to conduct it. The City and Litton then agreed to conduct the RI/FS under EPA oversight.

Comment: A commenter asked whether or not all pertinent information was revealed to the public by EPA in the September 19, 1988 public meeting.

EPA Response: All pertinent information regarding the landfills is contained in the Administrative Record on the landfills. This record is available for the public's review in the office of the Springfield City Clerk in City Hall. The public meeting lasted slightly more than two hours and concluded only when there were no more comments or questions from the public. Of course all of the documents or information in the Administrative Record, which is approximately 24 inches thick, could not be discussed in a two hour meeting. However, EPA believes that all relevant information was presented and explained, either during the meeting or in the documents (the RI Report, the FS, and the Proposed Plan) that were the subject of the meeting.

Comment: A commenter noted that the drum remnants in the sinkhole above the Fulbright Landfill had not been identified or characterized. The commenter then questioned why the contents of the sinkhole were not adequately characterized during the RI.

EPA Response: The sinkhole containing the drums and the drum remnants was difficult to sample because of the confined space and physical limitations of sending personnel into such spaces where hazardous substances are suspected. Some samples were collected in which some hazardous substances were identified, although not in toxic concentrations given the setting and inaccessibility of the sinkhole. It was determined that the most effective method for dealing with the drum remnants was to remove them from the sinkhole and then sample and analyze the contents to determine appropriate treatment or disposal. This was the alternative recommended in EPA's Proposed Plan.

Comment: A commenter stated that EPA's recommendation for monitoring two of the monitoring wells at the Fulbright sinkhole in lieu of removing the drums was inadequate protection of human health and the environment.

EPA Response: EPA did not recommend monitoring in lieu of removal of drums the Fulbright sinkhole. The Proposed Plan recommended that the contents of the Fulbright sinkhole be removed for treatment or disposal after sampling and analyses.

Ground water and surface water monitoring was recommended for both landfills in lieu of removal of all wastes from both landfills for treatment or offsite disposal.

Comment: A commenter stated that the Administrative Record released by EPA on the landfills is three feet tall and that a 21-day comment period was inadequate and did not allow the public to review and comment on the material.

EPA Response: The National Contingency Plan (NCP) requires a minimum 21-day comment period time for commenting on these documents in EPA's Superfund Program. EPA notes that it has attempted to keep the public informed about the landfill status and activities by periodically distributing fact sheets to members of the community, the news media, and members of the local community. EPA believes the 21-day public comment period does provide sufficient time for public review and comment.

Comment: A commenter, based upon review of the Administrative Record, stated that in 1982 the Federal Government (either EPA or the Department of Health and Human Services) found the ground water monitoring for the Fulbright Landfill inadequate.

EPA Response: The document referenced by the commenter from the Administrative Record was written in 1982. The ground water monitoring network in place in 1982 was much less extensive than that installed as part of the RI/FS. Although the earlier network may have been useful for screening, it was not, in EPA's opinion, sufficient as the final ground water monitoring network for the site. The network installed during the RI/FS is sufficient to monitor ground water flow and contaminant releases from both landfills.

Comment: A commenter asked how EPA can state in the Proposed Plan that no health-based criteria are being exceeded since information published in 1982 correspondence from EPA noted that the levels found of chloroethylene (980 parts per billion) and dichloroethylene (140 parts per billion) exceed health-based criteria.

EPA Response: Some of the contaminant levels found in earlier sampling of the landfills were not replicated in the RI sampling. Although low levels of contamination were found in some of the samples collected during the RI, it is not expected that any health-based criteria or standards would be exceeded at expected or potential points of use or exposure (i.e. the nearest drinking water wells).

Comment: A commenter stated, referencing 1980 correspondence found in the Administrative Record noting "terrible" leachate problems at the Fulbright Landfill, that since percolation of precipitation falling onto a landfill contributes to the formation of leachate, capping the landfills would seem to be ineffective. The commenter added that the landfills' location in a floodplain also makes capping ineffective.

EPA Response: EPA agrees with this comment regarding the ineffectiveness of a cap for these landfills. The Proposed Plan did not recommend a cap for some of these same technical reasons. Leachate seeps may have been a problem at the landfills in the past. However during the course of the RI/FS leachate seeps have only occasionally been noted and those which have been noted have been small and not heavily contaminated. EPA will require that any leachate problems which develop at either landfill be addressed in the post-closure monitoring and maintenance. At the present time leachate does not appear to pose a risk to human health at either landfill.

Comment: A commenter stated, referencing March 1982 correspondence found in the Administrative Record regarding the Soil Conservation Survey, that "the Fulbright site was quite extensive, encompassing an area larger than that proposed for sampling".

EPA Response: EPA agrees that the landfills are relatively large, although fairly typical for landfill sites (approximately 212 acres for both landfills). Geophysical investigations were used to confirm the dimensions of the landfills. In EPA's opinion the sampling and analyses conducted under the RI was sufficient to evaluate potential endangerment associated with both landfills. Any plan referred to in the above referenced document was not what was proposed or implemented during the RI/FS.

Comment: A commenter asked, referencing correspondence found in the Administrative Record from an engineering firm regarding the need for worker protection when working on the site, how the landfills can be safe if such protection was required?

EPA Response: EPA has acknowledged that industrial wastes, some of which probably contain hazardous substances, are still in the landfills. Although the levels of contamination currently being released into ground and surface water are very low and currently pose no threat to health or the environment, personnel protection was warranted in the instance of the activity discussed by that correspondence. Activities which have the potential to penetrate areas of waste disposal, such as the excavation for the construction of the new wastewater treatment plant adjacent to the Sac River Landfill or the drilling of monitoring wells in the RI/FS, warrant monitoring and protection of onsite personnel because of the much greater potential for contaminant releases and exposures associated with those specific, high-risk

activities. Such levels of monitoring and protection would not be needed for most onsite activities, such as just walking across the landfill surfaces, unless the landfills have been opened up exposing the wastes disposed.

Comment: A commenter asked whether or not the landfills were still listed by EPA as potential uncontrolled sites.

EPA Response: Both landfills indeed continue to be listed as potential uncontrolled sites. This is essentially a working list of all sites on which EPA or the State are addressing or may address under its Superfund program. Generally sites are not removed from this list even after it has been determined that they pose no threat to health or the environment. However, a site's status on the list may be changed to reflect current conditions relating to endangerment.

Comment: A commenter asked whether it was justified to have allowed the City to reduce the area of the ground water use survey to 1.0 mile.

EPA Response: Ground water use surveys are generally site-specific based upon the hydrogeologic conditions of a particular site. The area surveyed for the landfills was generally about one mile on either side of the river adjacent to the landfills. Given the hydrogeology setting of this site, the area surveyed is judged to be appropriate.

Comment: A commenter stated that a review of the Administrative Record noted a document between EPA and a consultant for the City which requested that higher than normal, or appropriate, detection limits be allowed on the water samples collected in the RI.

EPA Response: This correspondence reflects an effort on the part of one of the City's consultants to persuade EPA to accept higher detection limits on samples collected. EPA approval of the RI work was contingent upon the lower detection limits generally associated with drinking water supplies. By adhering to the more rigorous detection limits, EPA thereby assured protection of health and the environment.

Comment: A commenter noted the apparent discrepancy in EPA's position of saying that ground water monitoring and deed restrictions were warranted, while also saying that the sites did not pose a threat to the community. The commenter asked how EPA expects the community to deal with this apparent discrepancy.

EPA Response: EPA's position reflects its assessment of the risk associated with potential direct contact exposures associated with opening either landfill and reexposing the potentially contaminated wastes previously disposed. Such activities would

create a potential for direct contact exposures which are otherwise absent. Opening either landfill also increases the potential for contaminant releases when the soil cover is removed. Ground and surface water monitoring are required to assure contaminant levels do not at some time exceed acceptable levels, and also post-closure care to ensure the integrity of the cover.

Comment: A commenter requested that the public comment period of 21 days be extended to allow some of the owners of nearby property who had not known of the meeting to review the record on the landfills and be able to comment.

EPA Response: As previously stated, the National Contingency Plan (NCP) requires a minimum 21-day comment period. In response to some of the comments received during the public meeting, EPA has conducted a door-to-door survey of residents in the area. Many of the residents were aware of the RI/FS which had been conducted on the Fulbright/Sac River Landfills. None of the residents interviewed expressed serious reservations regarding the actions recommended by EPA in the Proposed Plan. EPA believes the comments received to date are representative of the community's concerns about the site. An extension of the comment period would not result in the raising of additional technical issues that would impact the selected response activities. The actions recommended for the landfills will not be implemented before December 1988. Any comments received from the public will be evaluated by EPA in terms of recommended changes in the remedial actions.

Comment: Several commenters stated that the notice on the public meeting was inadequate and that many owners of nearby property did not know of the meeting.

EPA Response: Local media and the City and State government were advised of the public meeting. Notice of the public meeting was sent to individuals on EPA's mailing list, which included individuals who had previously expressed an interest in the site. EPA believes that the estimated 40 people who did attend the meeting provided substantive comments representative of the community at large.

Comment: A commenter asked how many of the private drinking water wells in the area were sampled during the RI.

EPA Response: All of the monitoring wells on or adjacent to the landfills were sampled in the RI. The only drinking water well sampled was the well at the new wastewater treatment plant next to the Sac River Landfill. A well used as an alternate, or supplemental, source of City drinking water upgradient of the Fulbright Landfill, is routinely sampled under the drinking water program. Since the hydrogeology of the area indicated none of the private drinking water wells in the general vicinity of the site were at risk of contamination by the landfills, none were sampled as part of this RI/FS.

Comment: Several commenters asked why alternate water supplies were provided to residents in the North U Drive area.

EPA Response: Sampling of private wells in the North U Drive area revealed many of those wells to be contaminated with organic, petroleum-based contaminants not found in the landfill analytical results. EPA has used the Superfund Response Fund to provide the municipal drinking water to homes in which private wells had been contaminated. This was done as part of a separate Superfund site, the North U Drive site. The hydrogeologic and chemical data on water samples from North U Drive and from the Fulbright/Sac River Landfills, indicate that neither landfill is a source of the contaminants found in those wells.

Comment: A commenter asked how much it cost to sample and analyze water samples from drinking water wells, how much it cost to do this RI/FS, and whether or not this money would not have been better spent sampling all drinking water wells in the area.

EPA Response: Analyses of water samples for drinking water detection limits for hazardous substances generally costs from $1500-2000 each. The City estimates that the RI/FS cost $1,100,000. The objectives of this RI/FS were to identify contaminant releases and potential endangerment associated with the landfills. Since the hydrogeology of the sites, and the very low levels of contaminants found in the ground and surface water lead EPA to conclude that no drinking water wells are at risk of contamination, EPA did not require that any of the private drinking wells be sampled as part of the Fulbright and Sac River RI/FS.

Comment: A commenter noted that many of the private drinking water wells in the area are poorly cased or constructed, which can allow contaminants to flow down along the well casing into the aquifer from which water for drinking is withdrawn. The commenter asked if these wells should not be tested for contamination.

EPA Response: It would probably be worthwhile to sample and analyze water from these wells for contamination for contamination by sources other than the landfills. However, data from the RI/FS indicates that no drinking water wells are at risk of contamination by the landfills. It was therefore not necessary to sample these wells in order to evaluate endangerment associated with releases from the landfills. However, in order to be responsive to the community and to attempt to identify other (than the landfills) sources of ground water contamination in the area, EPA will assure that some high risk wells be tested for contamination.

Comment: A commenter pointed out an apparent discrepancy in the FS and the Proposed Plan. The commenter stated the FS states that no private wells were sampled in the RI/FS and the Proposed

Plan states that no private wells are contaminated.

EPA Response: No private wells were found at risk of contamination in the RI/FS from the landfills. Therefore none were sampled in the RI/FS. No private wells were found to be contaminated by the landfills, because none were sampled. EPA has agreed to assure that some of these wells will be tested for contamination, even though they are not believed to be at risk of contamination by releases from the landfills.

Comment: A commenter asked why the wastes in the cyanide pit had not been removed for offsite disposal.

EPA Response: Disposal of wastes in the cyanide pit ceased approximately 20 years ago. Ground water monitoring wells were placed through the cyanide pit (as best as it could be located) and downgradient of the Pit. Chemical analyses of water samples from those wells did not reveal significant levels of contamination. It is likely that the more soluble hazardous substances have already been released from the area via shallow ground water to the adjacent river. The analytical data from the RI did not support the need for waste removal at the Cyanide Pit.

Comment: Several commenters asked what kind of site use restrictions would be sought for the landfills, and for properties immediately adjacent to the landfills.

EPA Response: For the properties on which the landfills are located, EPA will seek deed restrictions which would prohibit activities which would significantly increase the risk of direct contact exposures or the potential for significantly increased contamination of ground or surface water. The following types of land uses would be prohibited or monitored:

1. The drilling of wells through or very near wastes for the consumption of water, or in a manner which could create an avenue of contaminant release into the bedrock aquifers.
2. Construction activities which would require excavation into areas of waste fill.
3. The construction of buildings or structures over waste fill which would have the potential for settling, and where settling of such surface structure might create safety or structural hazards.
4. The development of surface land for residential (homes) or recreational uses (parks) without adequate sampling and analyses of surface soils to assure no significant increase in potential direct contact exposures to contaminated surface soils.

Certain of the above would not necessarily always be prohibited. However, EPA would seek to assure that no unacceptable endangerment resulted. For example, wastes were safely excavated and redisposed for the construction of the new wastewater treatment plant next to the Sac River Landfill. Other types of similar construction might also be deemed safe, but only if the appropriate monitoring and personnel protection is

provided.

At this time EPA does not believe deed restrictions for the adjacent properties surrounding the landfills are necessary. The EPA would recommend that any use of ground water downgradient and near the landfills first require that the well water to be sampled and analyzed to assure contaminants above relevant standards or criteria are not exceeded. At this time there is no information indicating a change in ground water uses.

Comment: A commenter asked what types of hazards are associated with leachate seeps.

EPA Response: Generally the leachate which develops and surfaces from a landfill may be corrosive or toxic upon direct contact exposures. Corrosive leachate could burn the skin contacted. Skin rashes might result from leachate containing high levels of organic contaminants. However, the leachate found at these landfills has been found to contain only low levels of contamination. If the leachate were to somehow be accidentally ingested (an extremely unlikely occurrence), short-term gastrointestinal adverse effects (i.e., upset stomach, nausea, etc.) could result. If a sufficient quantity of the leachate were to be ingested, toxic, systemic effects could theoretically result. In addition the volume of the leachate surfacing as seeps has so far (during the RI/FS) been minimal. Contact with leachate is generally not intensive enough or frequent enough to make carcinogenic (i.e. cancer) effects a concern, even if the leachate contains potential carcinogens.

Comment: A commenter asked whether or not the sinkhole containing drum remnants was on City property.

EPA Response: The sinkhole is on City property, although this is not in the part of the landfill where most of the wastes were disposed. Most of the wastes were disposed in the floodplain. The sinkhole is on the bluff above the floodplain.

Comment: A commenter asked if there was not a well, used by the City for drinking water, located near the Fulbright Landfill.

EPA Response: The City does have a deep bedrock well located near Fulbright Spring, approximately 1,600 feet south (upgradient) of the Fulbright Landfill. The well is used as a supplemental (only when additional water is needed) source of municipal drinking water. The direction of ground water flow is from the well toward the landfills. In addition the vertical gradient from the surface to the deep bedrock aquifer is either up, or at least absent. Because of these factors, this well is not at any significant risk of the contamination by releases from either landfill. This results in little or no risk of contamination of the drinking water supply by releases from the landfills.

Comment: Several commenters had questions regarding the North U Drive site. While outside of the scope of the Fulbright/Sac River Landfill RI/FS, EPA and the State, the lead agency on the North U Drive site, responded to a number of these inquiries. One commenter noted that a variety of contaminants had been found in the private wells in the North U Drive area and that a variety of contaminants have also been found in the monitoring wells at the landfills. The commenter asked if it is just a coincidence that both sets of wells had a variety of contaminants, or are the landfills actually suspected contaminant sources of the contamination of the North U Drive.

EPA Response: Although a number of contaminants were found in both sets of wells, the types of contaminants present in the monitoring wells for the landfills did not match the contaminants found in the private wells at North U Drive. This leads EPA to suspect contaminant sources other than the landfills for the problems at the North U Drive site. The direction of ground water flow and the hydrogeologic setting of the landfills reinforce EPA's determination that the landfills are not the source of contaminants in those drinking water wells.

Comment: A commenter wanted to know if the source(s) of contamination at the North U Drive site would be identified.

EPA Response: A separate RI/FS is planned for the North U Drive site. The State has been the lead agency on that site. That RI/FS will attempt to identify and characterize the sources of the contamination in those private wells.

Comment: One commenter noted that the samples collected from the landfills during the RI/FS were only analyzed for chemicals on EPA's list of priority pollutants or hazardous substances. The commenter asked if it was not possible for other contaminants, not analyzed for in the RI/FS, to be escaping from the landfills.

EPA Response: It is correct that the samples collected in the RI/FS only analyzed for hazardous substance list chemicals ("HSLs"). This is standard for an RI/FS unless there is some specific reason to suspect a chemical which is not an HSL was disposed of at the site. There would be thousands of chemicals, both natural and man-made, which could theoretically be present in the wastes disposed in the landfills and released from the site. In order to measure compounds at meaningful detection limits, analytical standards are needed by the analyzing laboratory. Since only a given number of standards are available, laboratories can really analyze for a given number of

contaminants. Contaminants can be added in special circumstances where specific knowledge of their presence warrants.

In general analyses performed in an RI/FS are limited to HSLs. HSLs were selected as the most toxic, persistent and mobile compounds. Even though analytical laboratories can not conclusively identify compounds which are not HSLs, laboratories do "tentatively identify" other compounds. Tentatively identified compounds are those whose chromatographic peak (analytical method) is similar to another compound. The compound is thus "tentatively" identified. Potentially significant levels of tentatively identified compounds were not reported in the sample analyses under this RI/FS.

Comment: A commenter asked what could cause a change in the vertical gradient.

EPA Response: If water is moving from the surface down, a downward vertical gradient is said to exist. If ground water would flow upward, such as under artesian conditions, the vertical gradient is upward. The absence of a downward vertical gradient contributes to the absence of current endangerment at the landfills. In some areas the vertical gradient is even upward. In terms of natural forces the only event that could be identified which might change the vertical gradient would be a large area-wide earthquake, altering or increasing the fracturing of bedrock. The withdrawal of very large quantities of ground water from the deep bedrock aquifer very near the site could create a downward gradient. Ground water withdrawal will be tracked closely during the post-closure monitoring for the landfills.

Comment: A commenter suggested that the United States Geologic Survey (USGS) model be used to evaluate post-closure monitoring data for the landfills.

EPA Response: The USGS paper, which pertains to the potential for additional deep bedrock ground water withdrawals to create a downward vertical gradient, and which generated this comment, is not yet published or available for review. When the document is released, EPA intends to use the USGS model in review of post-closure monitoring at the site.

Comment: One commenter asked why waste excavation was allowed for the construction of the new wastewater treatment plant next to the Sac River Landfill, and if this kind of activity is to be prevented in deed restrictions for the landfills.

EPA Response: The waste excavation for the treatment plant construction was carefully monitored. Onsite workers were not exposed to toxic levels of contamination. The wastes exposed were found to be nontoxic and were safely redisposed in another part of the landfill. Any future excavation would require

similar precautions.

Comment: A commenter asked whether or not there was any change in ground water contaminant concentrations before versus after the construction of the new wastewater treatment plant.

EPA Response: All of the samples for the RI/FS were collected after the construction of the plant. Contaminant levels in these wells before the plant construction are not known.

Comment: A number of commenters asked why their drinking water well had not been sampled during the RI.

EPA Response: Review of the hydrogeologic setting and data during the RI indicated none of the private drinking water wells were at risk of contamination by releases from the landfills.

Comment: A commenter asked, on behalf of a number of the citizens present at the public meeting, how the scope of this RI/FS could be expanded to include sampling of the private drinking water wells in the area for contamination.

EPA Response: Review of the hydrogeologic data from the RI/FS determined that none of these wells are at risk of contamination by releases from the landfills. The very low contaminant levels in onsite monitoring wells further reduced the potential for contamination of any drinking water wells, even if flow would have been from the landfills toward such wells. However, in order to be responsive to the needs of the community, EPA will assure that private wells in the area be sampled and analyzed for contamination. Such sampling will be outside the scope of this RI/FS. However, EPA will review all such data generated to determine if assessments of potential endangerment at Fulbright/Sac River Landfills should be reassessed.